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Childrens' application of a verbal-nonverbal consistency principle to infer truth and lying

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Childrens' Application of a Verbal-Nonverbal Consistency Principle to Infer Truth and Lying

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Abstract

Research supports the conclusion that adults/adolescents employ a verbal-nonverbal consistency principle to determine whether others are telling the truth as opposed to lying (Friedman, 1978; DePaulo & Rosenthal, 1979). The verbal-nonverbal consistency rule specifies that an individual is perceived as telling the truth, as opposed to lying, when there is consistency in the affect exhibited between his/her verbal and nonverbal communication. In the study, kindergarten, second and fourth grade children were presented a) a set of specific verbal communications and b) a set of general verbal communications. After each verbal communication they were asked to indicate what facial expression the speaker would show if he/she was telling the truth and lying. It was found that use of the verbal -nonverbal consistency principle increased as a function of age. Fourth grade children showed the verbal-nonverbal consistency principle for both specific and general verbal communications by selecting facial expressions that matched the valence of the verbal communication for telling the truth and the facial expressions that do not match the valence of the verbal communication for lying.

Introduction

Social theorists have tried to understand the processes involved in social perceptions of truth. As part of this, they have attempted to determine what cues people use to infer whether others are telling the truth as opposed to lying (see DePaulo, Lassiter & Stone, 1985). Experimenters have undertaken this line of research for both adults and children (DePaulo & Rosenthal, 1979; Ackerman, 1983). One cue use principle that has been identified is the verbal-nonverbal consistency principle. Research by Friedman (1979), for example, has shown that such a principle is used by adolescents. The verbal-nonverbal consistency principle specifies that an individual is perceived as sincere or truthful when there is consistency between the affect exhibited in his/her verbal and nonverbal communication. For example, if an individual makes a positive valence statement (e.g. I like that tie) and accompanies that by a positive valence nonverbal communication (e.g. a smile) then he/she would be perceived as telling the truth. On the other hand, if an individual makes the same positive valence statement and accompanies that with a noncongruent nonverbal expression (e.g. a frown) then he/she would be percieved as lying.

Verbal-Nonverbal Consistency Principle in Adolescents and Adults

In his study, Friedman (1979) presented high school students descriptions of teacher-student interactions; written

sentences were paired with photographs of the teachers' expressions during those interactions. Teachers were shown as displaying combinations of four types (positive vs negative, dominant vs submissive) of both facial expressions and sentences. Students were asked to judge teachers on the basis of positivity, dominance and sincerity. It was found that the teacher was rated as sincere when the sentence and facial expression were consistent, either both positive or both negative. The teacher was rated as insincere when there was conflict or inconsistency between the facial expression and sentence. Thus the consistency principle implies that sincerity results from consistency in affect, even if both cues are negative in valence. Although the Friedman (1979) research examines the consistency principle in terms of sincerity and insincerity, it is assumed that sincerity/insincerity and truth/lying are conceptually related.

A number of authors have proposed that adults employ the same principle to infer truth and lying (e.g. DePaulo & Rosenthal, 1979). Some support for this hypothesis is provided by the finding that adults are better able to differentiate between truth and lying when verbal and nonverbal communication are presented together than when verbal communication is presented alone (DePaulo, Rosenthal, Green & Rosenkrantz, 1982). Hence, it would appear that adults use a combination of verbal-nonverbal consistency in order to make inferences of

truth and lying in others.

Verbal-Nonverbal Consistency in Children

There is evidence which suggests that children may use the verbal-nonverbal consistency principle. The research on children's understanding of facial display rules (see Harris, Donnelly, Guz & Pitt-Watson, 1986; Saarni, 1979; Gnepp, 1983; Gnepp & Hess, 1986) is relevant to children's use of the verbal-nonverbal consistency principle. This research addresses childrens understanding that others modify their facial expressions to accommodate to social situational demands, such as to protect their self-esteem or spare the feelings of others. A more direct investigation of children's use of the verbal-nonverbal consistency principle has been undertaken by Bugental and her colleagues. Bugental, Kaswan, Love and Fox (1970) examined the differences between children aged 5-18 and their parents in terms of identifying multichannel (visual, voice, content) messages. Moreover, they studied how evaluative information from the different channels was integrated in order to judge the entire message. Subjects were presented videotaped scenes in which messages from the three channels varied in valence (positive, neutral or negative). Subjects were asked to rate the scenes as either positive or negative on a rating scale. For analysis purposes, children were grouped into three or five year age spans (5-8, 9-12, 13-18).

It was found that both children and adults perceive evaluative meaning in all three communication channels. An age trend was found only for the visual channel, which had a reduced impact on younger children for whom the visual component of a message (how the person looked), was of less importance than the verbal content (what was said) or the vocal inflections (how it was said). Also, this age trend was significant only for children's differential perception of women's smiles; younger children (5-8) perceived women's smiles as less positive than did older children (13-18).

A second study by Bugental, Kaswan and Love (1970) represents a replication of the previous investigation. Unlike the previous investigation in which acted messages were produced containing no conflict, the central goal of the Bugental, Kaswan and Love (1970) study was to assess the interpretation of conflicting messages in adults and children by employing two models, one being linear and the other interactive. The linear model involved the adding together of the various inputs in order of their relative inportance in the interpretation of conflicting messages whereas the interactive model referred to the integration or combining of channel inputs. Bugental, Kaswan and Love (1970) presented subjects with actors who displayed messages in all possible combinations of positive and negative evaluation in each of the three channels (vocal, visual, content). Each subject saw four scenes representing one

combination of channel inputs, for example, positive script, positive picture, and negative voice scenes. Thirteen point rating scales were used to assess friendship judgement. The numbers +6 to -6 were accompanied by differently coloured boxes to represent degrees of friendship.

It was found that there are some differences between adults and children in the interpretation of conflicting communication. Conflicting messages, in which the speaker smiled while making a critical statement (ie. joking messages) were interpreted more negatively by children than adults, especially if the speaker was female. Additionally it was found that the subjects rated females more negatively than they did males. In terms of a linear versus interactive model, a strong and consistent interaction was found between verbal and vocal channels. It was found that an interactive model, that of a discounting principle was employed, by both adults and children, when messages received simultaneously from 2 channels were inconsistent. Discounting refers to the process of disregarding communication from one channel when it is inconsistent with the communication provided by another channel. Since the nature of the linear model does not allow for the consideration of discounting, it was concluded that a linear model was inadequate for predicting the integration of channel input.

There are limitations with the Bugental research which

warrant consideration (Bugental, Kaswan, Love & Fox 1970; Bugental, Kaswan & Love 1970). First, the research of Bugental and her colleagues does not examine the verbal-nonverbal consistency principle to infer truth and lying. Second, Bugental and her colleagues argued that the subjects demonstrated the use of a verbal-nonverbal consistency principle because their judgement conformed to an interactive summation of each of the script, picture and voice verbal-nonverbal dimensions. Apparently, information from one of these dimensions was discounted when there was conflict. The problem with this method is that discounting is not sufficient evidence for use of the consistency rule. For example, presentation of a positive valence nonverbal communication (eg. a smile) with a negative valence verbal communication (eg. a statement of disliking) may lead to a simple positive or negative evaluation. However, the demonstration of the use of the verbal-nonverbal consistency principle necessitates that the observer make an inference of lying; one not derivable from either communication alone or from given other combinations. Third, while Bugental and her colleagues employed pretesting by adult observers in order to clarify the different evaluative dimenions, they did not asess or ensure that the children detected those dimensions accurately prior to judgement.

The verbal-nonverbal consistency principle was further investigated by Rotenberg and Bacic (1980), who examined the

role of consistency and benevolence attributes as a bases of children's trust. According to the benevolence principle, an individual trusts another person because he/she is perceived as being helpful rather than harmful, whereas the verbal-nonverbal consistency principle implies that trust is dependent upon consistency between verbal and nonverbal communication. Rotenberg and Bacic (1980) hypothesized that when perceiving others, the use of consistency but not benevolence was dependent on the co-occurence of verbal and nonverbal communications. The rationale for this was as follows: An individual's emotional state is shown by his/her concurrent verbal and nonverbal communication. For example, when an individual smiles and states something positive at the same time, he/she indicates by both communications his/her emotional state, at least with respect to the object of the sentence. This is not conveyed if the communications are presented apart because the smile no longer implies a positive emotional state with regard to the object of the sentence. If children base their trust on consistency then they should judge a consistent person as more trustworthy than an inconsistent one, but only when he/she shows the verbal nonverbal communication concurrently. Such temporal relations are not critical if children use a benevolence principle; they should judge a person providing a positive valenced communication as more trustworthy than one who provides negative valenced communication regardless of concurrence of the verbal and nonverbal communication.

In the Rotenberg and Bacic (1980) study, six and nine year old children were asked to judge, on the basis of a trust judgement scale, videotaped actors depicting four possible combinations of consistent vs nonconsistent and co-occuring vs not co-occuring verbal and nonverbal communications. It was found that the younger children trusted the consistent positive actor more than the inconsistent actor regardless of whether the communications were co-occuring or apart, thus indicating that they used a benevolence principle. Nine year old children trusted the consistent actor more than the inconsistent actor primarily when the communications were co-occuring rather than presented apart suggesting that they used a verbal-nonverbal consistency principle.

A second study by Rotenberg and Bacic (1980) was designed to investigate an age shift on the basis of trust. Children from each of kindergarten, second, fourth and sixth grade were presented two actors who demonstrated verbal and nonverbal communication that opposed the benevolence and consistency principles. Actor 1 demonstrated a statement of disliking and a frown; this was consistent but of negative valence. Actor 2 demonstrated a statement of disliking and a smile; this was inconsistent but of more positive valence. It was hypothesized that if children based their trust primarily on benevolence rather than consistency, then they would trust the actor who provided the disliking statement and the smile more, while those

children who based their trust primarily on a consistency principle rather than benevolence, would trust the actor providing the disliking statement and the frown more. This former pattern was shown by kindergarten children while the latter pattern was shown by sixth grade children.

There are two notable limitations with the Rotenberg and Bacic (1980) research. First, they examined the use of the consistency principle in terms of trust, which is conceptually related to truth and lying, but did not examine it that directly. Secondly, confounding occurs when the verbal and nonverbal communications are presented apart. The problem resides in the fact that it is impossible to disassociate verbal and nonverbal communications in videotape. For example, the actors in the apart condition were by necessity showing neutral expressions when they were providing the verbal communications. There was some evidence of this; older children were sensitive to that inconsistency and judged the actors who provided the apart communications as less trustworthy than the together communications.

Overview and Hypothesis Guiding the study.

The study was designed to investigate whether, and if so at what age, children apply the consistency principle to infer truth and lying. Furthermore, it was designed to overcome the

methodological problems of the previous research (Bugental, Kaswan, Love & Fox, 1970; Bugental, Kaswan & Love, 1970; Rotenberg & Bacic, 1980).

In the study, kindergarten, second and fourth grade children were presented specific verbal communications of positive, neutral and negative valence, and were asked to indicate what facial expression the speaker would show if he/she was telling the truth and lying. They were also presented general verbal communications of positive and negative valence, and similarly asked to indicate what facial expression the speaker would show if he/she was telling the truth and lying. These general communications served as an assessment of whether subjects would generalize their choice patterns to a conceptual class of positive and negative valenced verbal communications. Based largely upon the findings of Rotenberg and Bacic (1980), it is expected that fourth grade children would show the verbal-nonverbal consistency principle for both the specific and general verbal communications by selecting facial expressions that match the valence of the verbal communication for telling the truth and the facial expressions that do not match the valence of the verbal communication for lying. The verbal-nonverbal consistency principle choice pattern is shown, in the form of percentages in Table 1. It should be emphasized that the percentages shown are ideals and that children would only be expected to approximate them. For example, if the children were provided a positive valence verbal communication

and asked what facial expression the speaker would show if he/she were telling the truth (a truth judgement), then they should choose a positive valence nonverbal expression as indicated in the upper left quadrant of Table 1. Similarily, if the children were provided a negative valence verbal communication and asked what facial expression the speaker would show if he/she were telling the truth, then they should choose a negative valence nonverbal expression, as demonstrated in the lower right hand quadrant of Table 1.

Table 1

The Verbal-Nonverbal Consistency Principle Choice Pattern

Valence of Verbal Communication	Judgement	Valence of Facial Expression		
		Positive (Smile)	Neutral (Neutral)	Negative (Frown)
Positive	Truth	100%	0%	0%
	Lying	0%	50%	50%
Neutral	Truth	0%	100%	0%
	Lying	50%	0%	50%
Negative	Truth	0%	0%	100%
	Lying	50%	50%	0%

Method

Subjects

Subjects were 17 children (8 girls and 9 boys) from kindergarten, and 20 children (10 girls and 10 boys) from each of second and fourth grades. Subjects were selected from elementary schools, in Thunder Bay, Ontario. Participation was contingent upon parental permission. (shown in appendix A)

Stimulus and Apparatus

Children were presented three line drawn faces (shown in appendix B) which depicted a smiling expression, a frowning expression and a neutral expression. Each facial expression was drawn upon a 10" by 12" placard.

An audio tape recording was constructed in which 6 adults (3 males and 3 females) were recorded while each provided 6 verbal statements. Two of those statements were of positive valence (I like that shirt; I like that food), two were of neutral valence (My house is white; My shoes are brown), and two were of negative valence (I do not like that coat; I do not like that book). These statements served as the specific verbal communications in the experiment. The individuals providing the statements were instructed to do so with a neutral tone of verbal communication.

An additional audio tape was constructed to function as a practice recording to ensure that the children understood the procedure. The practice tape consisted of a male speaker who provided a negative statement (I do not like that television program), and a female speaker who provided a positive statement (I like that tie).

In addition, four general statements regarding liking and disliking were included; these are described in the subsequent procedure.

Procedure

Subjects were tested individually. Each subject was asked to indicate which of the line drawn faces was smiling, then which was frowning, and finally which was not smiling or not frowning. If a facial drawing was not correctly identified, then this procedure was repeated until the subject correctly identified all three facial drawings. Children were explained the operation of the recording device and told that although they could hear the speaker's voice they could not see their face, and therefore must imagine what the speaker's face looked like while they were speaking. The procedure for testing of the specific verbal communications was as follows. Children were tested twice. During each testing they were told that following each recorded statement they would also be asked to

indicate how the speaker's face would look if he/she were telling the truth or lying. Following this, the children were presented the audio recordings. Each subject heard two statements for each of the positive, neutral and negative valence verbal communications. For the first testing the children were asked, for one statement of a given valence, to indicate which facial expression the speaker would show if he/she were telling the truth. For the second statement of the same valence, the children were asked to indicate which facial expression the speaker would show if he/she were lying.

The reverse questionning was asked during the second testing which occured approximately a week later (e.g. a lying question for the first statement and a truth question for the latter). In the second testing, following presentation of the specific verbal communications, children were asked to choose the corresponding facial expressions to <u>general verbal communications</u> for both truth and lying judgements. For example, the child was asked "if a person said he or she liked something" what would his/her face look like if he or she were telling the truth and what would his/her face look like if he or she were telling a lie. This same line of questionning was asked for "if a person said that he or she didn't like something".

Results

Specific Verbal Communications

The facial expression choices for specific verbal communications were coded by assigning one point for each time the subject chose a facial expression which matched the valence of verbal communication for a truth judgement and did not match the valence of verbal communication for a lying judgement. This is demonstrated in the verbal-nonverbal consistency principle choice pattern which is shown in Table 1. Each subject could receive a possible 12 points; corresponding to the three valence of verbal communications, two statements and two sex of speakers. These data were then subjected to a 3 grade (kd, second, fourth) x 2 sex of child (male, female) x 2 sex of stimulus person (male, female) analysis of variance with repeated measures on the last variable. (The variance source table for ANOVA is shown in Appendix C). A main effect was found for grade only, F (2,51) = 5.23, $p < .01$. The verbal-nonverbal consistency scores increased as a function of grade, with means of 6.35, 7.10 and 7.60 for the kindergarten, second and fourth grades respectively.

Although the analysis of variance did indicate that the verbal-nonverbal consistency scores increased with age, the analysis did not indicate specifically which pattern the children demonstrated. This issue was addressed by tallying the

frequencies of the facial expression responses, for each grade, and subjecting the data to a 2 Sex of Child x 2 Judgement (truth, lying) x 3 Valence of Verbal Communication (positive, neutral, negative) x 3 Valence of Nonverbal Communication (smile, neutral, frown) loglinear analysis. The strength as well as the statistical significance of this analysis was considered. The results of the loglinear analysis are shown in Appendix D. The only meaningful results for those analyses are the main effects or interactions with the valence of nonverbal communication. All four-way interactions, sex of child x valence of verbal communication x valence of nonverbal communication x judgement, for the analyses were not statistically significant.

The analysis of the facial expression choices of kindergarten subjects yielded a main effect of valence of nonverbal communication, X^2 (2, N=17) = 112.40, p < .001. This finding was qualified by two higher order two-way interactions: (a) valence of nonverbal communication x judgement interaction, X^2 (2, N=17) = 252.23, p < .001 and (b) valence of verbal communication x valence of nonverbal interaction, X^2 (4, N=17) = 60.08, p < .001. Findings indicate that the latter two-way analysis was further qualified by sex of the child, however this interaction was likely due to the unequal sample size of kindergarten children. These findings were somewhat qualified by a higher order three-way interaction, valence of verbal

communication x judgement x valence of nonverbal interaction, X^2 (4, N=17) = 8.867, $p < .05$.

The three interactions correspond to the following patterns. First, the kindergarten subjects tended to choose the positive nonverbal communication (a smile) for truth judgements and choose a negative nonverbal communication (a frown) for lying judgements (the frequencies are shown in table 2). Second, these subjects tended to employ a partial matching strategy in which they chose positive nonverbal communications for positive verbal communications and negative nonverbal communications for the negative verbal communications (the frequencies are shown in table 3). Third, the kindergarten subjects showed in part, the verbal nonverbal consistency principle. They frequently chose the positive nonverbal communication to the positive verbal communication for truth judgements more frequently than other valences of nonverbal communication and than those choices for lying judgements (the frequencies are shown in table 4).

The analysis of the facial expression choices of the second grade subjects yielded a main effect of valence of nonverbal communication, X^2 (2, N=20) = 5.293, $p < .05$. This finding was qualified by the expected valence of verbal communication x valence of nonverbal communication x judgement interaction, X^2 (4, N=20) = 93.41, $p < .001$. The analysis also yielded a sex of

child x valence of nonverbal communication interaction, X^2 (2, N=20) = 14.559, $p < .01$, which was further qualified by a higher order sex of the child x valence of nonverbal communication x judgement interaction, X^2(2, N=20) = 6.94, $p < .05$.

The two interactions correspond to the following patterns. First, the second grade subjects did, in part, demonstrate a verbal-nonverbal consistency pattern. They showed a matching valences strategy for truth judgements and a mismatching strategy for lying judgements. However, there was a strong tendency for the second grade subjects to show, for the negative valence verbal communications, the kindergarten strategy of choosing a matching valence of nonverbal communication regardless of judgement (the frequencies for these interactions are shown in table 5). Secondly, for the female second grade subjects there was a tendency to choose the negative valence nonverbal communication for lying judgements, regardless of the valence of the verbal communication (the frequencies are shown in table 6).

The analysis of the facial expression choices of the fourth grade subjects yielded a main effect of valence of nonverbal communication, X^2(2, N=20) = 11.11, $p < .01$. This finding was qualified by the expected valence of verbal communication x valence of nonverbal communication x judgement interaction, X^2 (4, N=20) = 115.62, $p < .001$. The analysis also yielded a sex

Table 2

Frequencies for the Valence of Nonverbal Communication as a function of Judgement to Specific Verbal Communications by Kindergarten Subjects.

Valence of Nonverbal Communication	Judgement	
	Truth	Lying
Smile	170	22
Neutral	4	42
Frown	30	140

Table 3

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Interaction to Specific Verbal Communications by Kindergarten Subjects.

Valence of Verbal Communication	Valence of Nonverbal Communication		
	Smile	Neutral	Frown
Positive	81	14	41
Neutral	72	16	48
Negative	39	16	81

Table 4

Frequencies for the Valence of Verbal Communication x Judgement x Valence of Nonverbal Interaction to Specific Verbal Communications by Kindergarten Subjects.

Valence of Verbal Communication	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	Lying	14	13	41
	Truth	67	1	0
Neutral	Lying	6	15	47
	Truth	66	1	1
Negative	Lying	2	14	52
	Truth	37	2	29

of child x valence of nonverbal communication interaction, $\underline{X}^2$ (2, $\underline{N}$=20) = 10.756, $\underline{p}$ < .05 which was further qualified by a sex of child x valence of verbal communication x valence of nonverbal communication interaction $\underline{X}^2$ (4, $\underline{N}$=20) = 28.64, $\underline{p}$ < .001.

The two interactions correspond to the following patterns. First, the fourth grade children demonstrated the verbal-nonverbal consistency principle and adopted a matching valence strategy for truth judgements and a mismatching valence strategy for lying judgements. Also, there was some tendency for these subjects to choose the negative valence nonverbal communication for a negative valence verbal communication with a lying judgement more frequently than that expected on the basis of the verbal-nonverbal consistency principle (the corresponding frequencies derived from the verbal nonverbal consistency principle are shown in table 7). Secondly, the fourth grade females showed more of a strategy of matching the valence of the nonverbal to the valence of the verbal communication than did males (the frequencies are shown in table 8).

General Verbal Communications

The facial expression choices for the general verbal communications were coded the same way as the specific verbal communications. One point was assigned each time the subject chose a facial expression which matched the valence of verbal

Table 5

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Communication x Judgement Interaction to Specific Verbal Communications by Second Grade Subjects.

Valence of Verbal Communication	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	Lying	3	36	41
	Truth	78	2	0
Neutral	Lying	6	50	24
	Truth	67	13	0
Negative	Lying	14	34	32
	Truth	12	26	42

Table 6

Frequencies, by sex of child, for the Valence of Nonverbal Communication x Judgement Interaction to Specific Verbal Communications by Second Grade Subjects.

Sex of Child	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Male	Lying	17	71	32
	Truth	74	25	21
Female	Lying	6	49	65
	Truth	83	16	21

communication for a truth judgement and did not match the valence of verbal communication for a lying judgement. The children could receive a possible score of 4; corresponding to the two valences of verbal communication (positive, negative) and two judgements (truth, lying). The facial expression choices to the general verbal communications were subjected to similar ANOVAs and loglinear analyses. A 3 grade (kindergarten, second, fourth) x 2 sex (male, female) ANOVA of the verbal-nonverbal consistency scores yielded main effects of grade only, F (2,51) = 6.84, $p < .01$. The scores increased as a function of grade, with means of 2.35, 2.85 and 3.30 for kindergarten, second and fourth grades respectively.

As with the specific verbal communications, frequencies of the facial expression choices were tallied for the general verbal communications and subjected to a 3 grade (kindergarten, second, fourth) x 2 sex (male, female) x 2 valence of verbal communication (positive, negative) x 3 valence of nonverbal communication (smile, neutral, frown) x 2 judgement (truth, lying) loglinear analysis.

The analysis of the facial expression choices of the kindergarten subjects yielded a main effect of the valence of the nonverbal communication, X^2(2, N=17) = 19.91, $p < .001$, that was further qualified by two two-way interactions a) valence of verbal communication x valence of nonverbal communication, X^2(2,

Table 7

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Communication x Judgement Interaction to Specific Verbal Communications by Fourth Grade Subjects.

Valence of Verbal Communication	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	lying	12(0)	41(40)	27(40)
	Truth	71(80)	9(0)	0(0)
Neutral	Lying	7(40)	54(0)	19(40)
	Truth	47(0)	29(80)	4(0)
Negative	Lying	22(40)	37(40)	21(0)
	Truth	7(0)	16(0)	57(80)

* figures in parentheses denote expected frequencies.

Table 8

Frequencies, by Sex of Child, for the Valence of Verbal Communication x Valence of Nonverbal Communication to Specific Verbal Communications by Fourth Grade Subjects.

Valence of Verbal Communication	Sex of Child	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	Male	33	37	10
	Female	50	13	17
Neutral	Male	33	36	11
	Female	21	47	12
Negative	Male	16	34	30
	Female	13	19	48

N=17) = 15.13, p < .001 and b) valence of nonverbal communication x judgement interaction, X^2(2, N=17) = 49.57, p < .001.

The two interactions correspond to the following patterns. First, the kindergarten children showed to a lesser extent, the strategy of matching the valence of the nonverbal communication to the valence of the verbal communication (the frequencies are shown in table 9). Secondly, these subjects chose the positive valence nonverbal communications for the truth judgements and chose the negative valence nonverbal communications for lying judgements (the frequencies are shown in table 10).

The analysis of the facial expression choices of the second grade subjects yielded a main effect of the valence of nonverbal communication, X^2 (2, N=20) = 1.215, p < .05. This was further qualified by two two-way interactions a) valence of verbal communication x valence of nonverbal communication interaction, X^2(2, N=20) = 20.18, p < .001 and b) valence of nonverbal communication x judgement interaction, X^2(2, N=20) = 39.04, p < .001. These were qualified by the expected 3 way valence of verbal communication x valence of nonverbal communication x judgement interaction, X^2(2, N=20) = 14.09, p < .001.

As with the specific verbal communications, the second grade children showed part of the expected verbal-nonverbal

consistency pattern. For the positive valence verbal communication they chose a matched valence of nonverbal communication for the truth judgements and a mismatched valence of nonverbal communication for the lying judgements. For the negative valence verbal communication however, they tended to show a matching pattern regardless of truth or lying judgement (frequencies are shown in table 11).

The analysis of the facial expression choices of the fourth grade subjects yielded two two-way interactions a) valence of verbal communication x valence of nonverbal communication interaction, X^2 (2, N=20) = 15.87, p < .001 and b) valence of nonverbal communication x judgement interaction, X^2 (2, N=20) = 23.91, p < .001. These were qualified by the expected three-way valence of verbal communication x valence of nonverbal communication x judgement interaction, X^2(2, N=20) = 27.91, p < .001.

The fourth grade children demonstrated the expected verbal-nonverbal consistency pattern, however they chose more negative valence nonverbal communications for the negative verbal communications for a lying judgment more frequently than expected (the corresponding frequencies and the expected frequencies derived from the verbal-nonverbal consistency principle are shown in table 12).

Table 9

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Communication to General Verbal Communications by Kindergarten Subjects.

Valence of Verbal Communication	Valence of Nonverbal Communication		
	Smile	Neutral	Frown
Positive	23	5	12
Negative	13	6	21

Table 10

Frequencies for the Valence of Nonverbal Communication x Judgement Interaction to General Verbal Communications by Kindergarten Subjects.

Valence of Nonverbal Communication	Judgement	
	Lying	Truth
Smile	6	30
Neutral	9	2
Frown	25	8

Discussion

This study was designed to investigate whether, and if so at what age, children apply the verbal-nonverbal consistency principle to infer truth and lying. The findings supported the conclusion that the use of the consistency principle was acquired with age. Kindergarten children did apply, in part, the verbal-nonverbal consistency principle, this was was more evident in second grade children and was manifested by fourth grade children with some exception. These findings are similar to those of Rotenberg and Bacic (1981), who found an age increase in the use of the verbal-nonverbal consistency principle.

In the present study, the kindergarten children frequently chose positive valenced nonverbal communication for truth judgements and negative valenced nonverbal communication for lying judgements. This finding is consistent with that of Rotenberg and Bacic (1981) who found that kindergarten children used a benevolence principle in their assessment of trust. The children in the present study were equating positive valence of a smile with telling the truth and the negative valence of a frown with lying. Furthermore, this pattern may arise from young children's "halo" view of truth as something good or positive and "devil" view of lying as something bad or negative.

Table 11

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Communication x Judgement Interaction to General Verbal Communications by Second Grade Subjects.

Valence of Verbal Communication	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	Lying	0	10	10
	Truth	20	0	0
Negative	Lying	2	6	12
	Truth	4	7	9

Table 12

Frequencies for the Valence of Verbal Communication x Valence of Nonverbal Communication x Judgement Interaction to General Verbal Communications by Fourth Grade Subjects.

Valence of Verbal Communication	Judgement	Valence of Nonverbal Communication		
		Smile	Neutral	Frown
Positive	Lying	1(0)	13(10)	6(10)
	Truth	20(20)	0(0)	0(0)
Negative	Lying	5(10)	9(10)	6(0)
	Truth	2(0)	5(0)	13(20)

* figures in parentheses denote expected frequencies.

As mentioned, there were exceptions of the consistency pattern for fourth grade children. First, these children chose negative valenced nonverbal communications for negative valenced verbal communications for lying judgements more frequently than expected. Secondly, the fourth grade children did not demonstrate an application of the consistency principle to the neutral valenced verbal communications; they frequently selected the neutral nonverbal communication to the neutral verbal communication for lying judgements. These exceptions may be due to the following. The first pattern may reflect the tendency for older children to manifest some of the halo effects observed in the kindergarten children. With such a halo effect they would have difficulty in applying the verbal-nonverbal consistency principle to the negative valence verbal communications for lying judgment. This requires the children to choose a positive valence nonverbal communication for a lying judgment. The second pattern may indicate that the children chose neutral nonverbal communication when they were uncertain of the answer. Several children commented on this during the experiment. One other explanation is that the neutral communications were perceived by the fourth grade children as of more positive than of neutral valence. It is difficult to present verbal communication that have unequivocal neutral affective meaning.

There were some sex differences in second and fourth grade

children. There was a tendency for the female second grade subjects to choose the negative valence nonverbal communication for lying judgements, regardless of the valence of the verbal communication. With the fourth grade subjects, there was a tendency for the females to show more of a strategy of matching the valence of the nonverbal communications to the valence of the verbal communications. The strategy of choosing the valence of nonverbal communication for both the second and fourth grade females is very similar to the strategy used by kindergarten children. This may reflect a developmental difference in male and female children in their ability to apply the consistency principle to infer truth and lying in others. For future research, addressing the sex differences of children, in their application of the verbal-nonverbal consistency principle, might yield more concrete results.

One direction for future research would be to assess children's application of the verbal-nonverbal consistency principle in a more natural context. Examining children in their natural enviroment, interacting with their peers, might provide researchers with valuable information regarding other cues that children incorporate when applying the verbal-nonverbal consistency principle in order to infer truth and lying in others.

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RTMENT OF PSYCHOLOGY

Appendix A Parental Permission Form

Dear Parent:

The purpose of the study is to gather information about how children of different ages use in their judgments of truthfulness the relationship between what people say and their facial expressions. In the study, the children will be presented a series of statements on videotape, such as "I like that shirt." The children will be asked to decide what facial expression the speaker would show if he/she was telling the truth and what facial expression the speaker would show if he/she was lying.

The study will take approximately 1 hour and it will be conducted in class in the school. It should be emphasized that the present study is concerned with the general way that children of different ages respond and it is not concerned with any given child. In effect, the responses of any given child will be kept completely confidential and the findings will be considered and reported solely in terms of the responses of the groups of children at different ages. Please fill out the attached form, indicating whether or not you are willing to let your child participate in the study, and return it to your child's school.

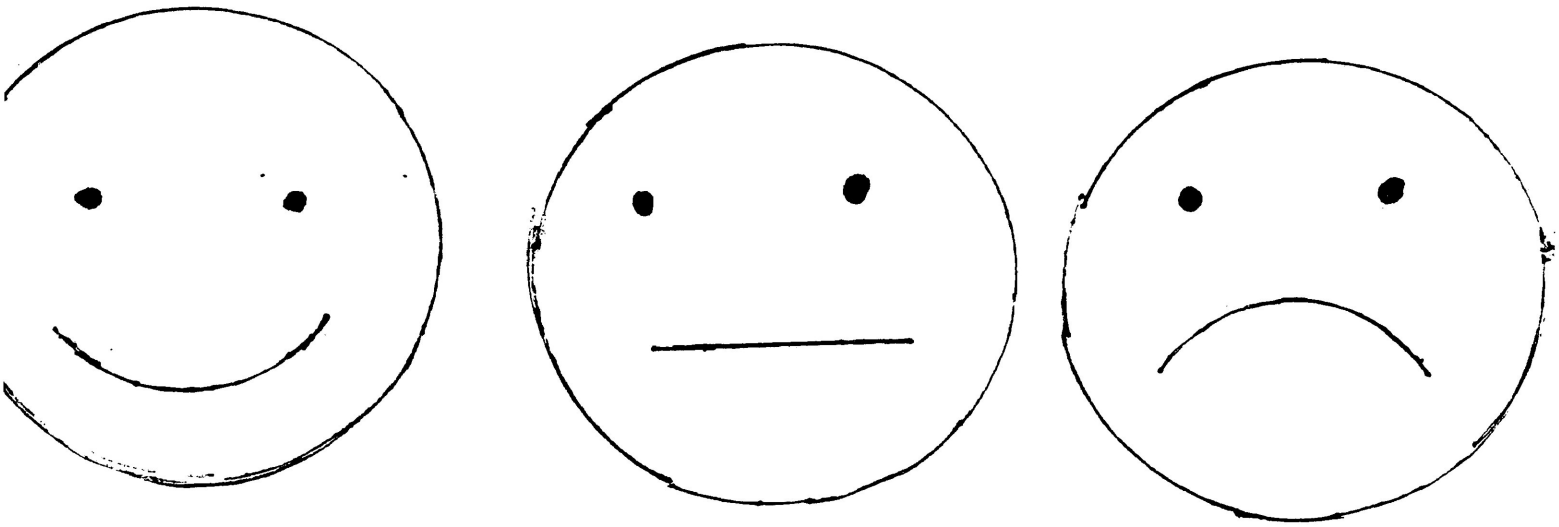
Yours sincerely,

Debbie Moore
M. A. candidate

DM/ml

Appendix B

Facial Expression Drawings



Appendix C

Variance Source Table for ANOVA

3(Grade) x 2(Sex of Child) x 2(Sex of Speaker)

Source	df	ss	ms	f
Grade	2	35.67	17.84	5.23 **
Sex	1	.04	.04	.01
Grade by Sex	2	3.13	1.56	.46
Subjects within groups	51	173.84	3.41	

** p <.01

Appendix D

The ChisQ Tests of Partial Association by Grade For Specific Communications

Effect Name	Grade		
	Kindergarten	Second	Fourth
Sex of Child x Valence of Verbal Comm. x Valence of Nonverbal Comm.	(4) 6.836	(4) 4.793	(4) 28.639 ***
Sex of Child x Valence of Verbal Comm. x Judgement	(2) 11.497 *	(2) .171	(2) 9.146 *
Sex of Child x Valence of Nonverbal Comm. x Judgement	(2) .531	(2) 6.936	(2) .093
Valence of Verbal Comm. x Valence of Nonverbal Comm. x Judgement	(4) 8.867	(4) 93.405 ***	(4) 115.624 ***
Sex of Child x Valence of Verbal Comm.	(2) 7.291	(2) .619	(2) .846
Sex of Child x Valence of Nonverbal Comm.	(2) 1.692	(2) 14.559	(2) 10.756
Valence of Verbal Comm. x Valence of Nonverbal Comm.	(4) 60.077 ***	(4) 93.912 ***	(4) 84.201 ***
Sex of Child x Judgement	(1) .732	(1) .007	(1) .315
Valence of Verbal Comm. x Judgement	(2) 56.701	(2) 24.488	(2) 4.866
Valence of Nonverbal Comm. x Judgement	(2) 252.230 ***	(2) 199.313 ***	(2) 83.763 ***
Sex of Child	(1) 8.372	(1) .000	(1) .000
Valence of Verbal Comm.	(2) 5.623	(2) .000	(2) .000
Valence of Nonverbal Comm.	(2) 112.400 ***	(2) 5.293 *	(2) 11.110 **
Judgement	(1) 2.727	(1) .000	(1) .000

* $p < .05$ ** $p < .01$ *** $p < .001$

note: the DF are shown in parenthesis.

Appendix E

The ChisQ Tests of Partial Association by Grade for General Communications

Effect Name	Grade		
	Kindergarten	Second	Fourth
Sex of Child x Valence of Verbal Comm. x Judgement	(1) .001	(1) .000	(1) .016
Sex of Child x Valence of Verbal Comm. x Valence of Nonverbal Comm.	(2) .281	(2) .045	(2) .164
Sex of Child x Judgement x Valence of Nonverbal Comm.	(2) .010	(2) 3.842	(2) 1.453
Valence of Verbal Comm. x Judgement x Valence of Nonverbal Comm.	(2) .934	(2) 14.085 **	(2) 27.760 ***
Sex of Child x Valence of Verbal Comm.	(1) .000	(1) .229	(1) .009
Sex of Child x Judgement	(1) .000	(1) .252	(1) 1.201
Valence of Verbal Comm. x Judgement	(1) 8.966 *	(1) 7.717 *	(1) 1.398
Sex of Child x Valence of Nonverbal Comm.	(2) .361	(2) 3.226	(2) 5.891
Valence of Verbal Comm. x Valence of Nonverbal Comm.	(2) 15.128 **	(2) 20.183 ***	(2) 15.865 **
Judgement x Valence of Nonverbal Comm.	(2) 49.564 ***	(2) 39.042 ***	(2) 23.905 ***
Sex of Child	(1) .235	(1) .000	(1) .000
Valence of Verbal Comm.	(1) .000	(1) .000	(1) .000
Judgement	(1) .000	(1) .000	(1) .000
Valence of Nonverbal Comm.	(2) 19.911 ***	(2) 1.215 *	(2) .176

* $p < .05$ ** $p < .01$ *** $p < .001$

note: the DF are shown in parenthesis

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